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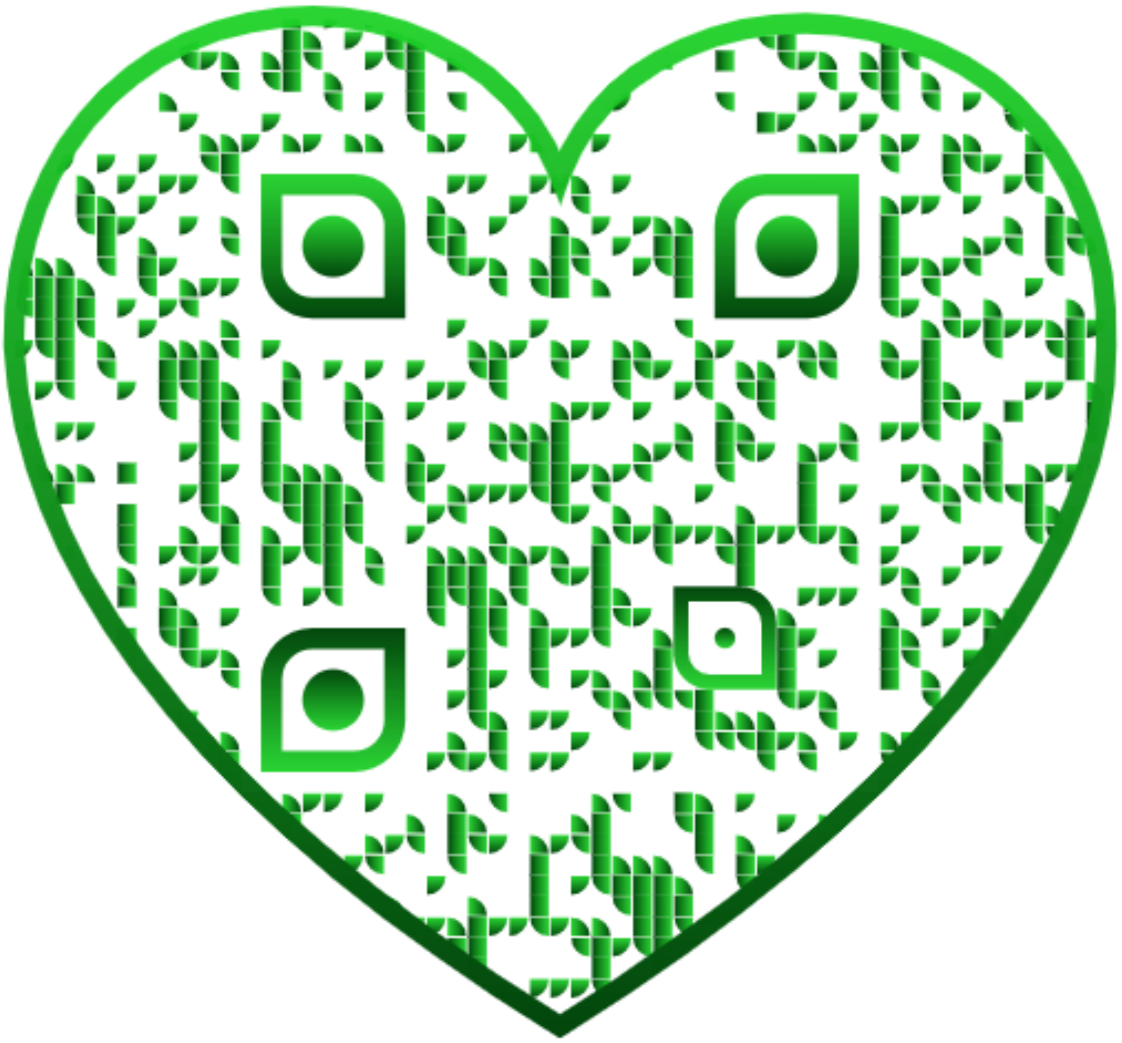
WORLD OF WONDERS

FAUNA AND FLORA OF CANADA'S ONLY SEMI-ARID DESERT

CANADIAN WILDLIFE FEDERATION

SEPTEMBER + OCTOBER 2025
VOLUME 31, NUMBER 4



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Beautiful Grasslands

GRASSLANDS COVER OVER ONE-THIRD of the Earth's land area; here in Canada, they sweep across Alberta, Saskatchewan and Manitoba, teeming with life. This magnificent ecosystem supports hundreds of wild species, from the smallest flower flies to roaming herds of bison.

Their wildflowers support countless pollinators, while their wetlands provide critical breeding grounds for waterfowl. Perhaps most remarkably, grasslands store one-third of the world's land-based carbon deep in their soil. As wildfires become increasingly common in Canada, our grasslands might be one of our most valuable tools to fight climate change.

Yet as crops, roads, and oil and gas development have sprung up across the Prairies, we've witnessed a heartbreaking transformation. Our precious grasslands are disappearing. In the last 25 years, an estimated 52 tonnes of carbon dioxide per hectare have been released from the Northern Great Plains grasslands converted to crops.

Today, less than 20 per cent of native grasslands remain. The dramatic loss leaves increasingly scarce habitat for the 70 species at risk that depend on these ecosystems — species like the long-billed curlew, swift fox, greater sage-grouse and burrowing owl.

Beginning on page 14, *Canadian Wildlife* magazine explores the proposed South Okanagan-Similkameen national park reserve, which would safeguard one of Canada's rarest ecosystems: semi-arid grasslands. Though just 1/25th the size of Banff National Park, this reserve would protect treasures like Spotted Lake and the South Okanagan Grasslands, home to more than 30 federally listed species at risk, including the burrowing owl and Pacific chorus frog.

The Canadian Wildlife Federation has been working closely with Canadian ranchers on prairie rangelands for years, approaching this work with deep humility and respect for their knowledge. Together, we're identifying the biodiversity benefits of grazing cattle on unconverted grasslands.

JESS DEEKS

We're also partnering with Indigenous communities through the kihci-okâwîmâw askiy Knowledge Centre at the University of Saskatchewan, amplifying Indigenous voices and conservation solutions. We view these communities as vital partners. Their knowledge of and love for the land runs deep, and most of the remaining natural grasslands in Canada are stewarded by these ranchers and Indigenous communities. This collaboration brings together our heads, hearts and hands in ways that give us hope for the grasslands and the species that call them home.

CWF is committed to increasing awareness about these beautiful, endangered ecosystems among all Canadians. We believe the understanding and appreciation that comes with that knowledge and awareness will help drive the conservation actions we need to take together. Everyone has a role — no matter where you live in Canada. As one of our most valuable yet vulnerable landscapes, grasslands deserve and need our boldest conservation efforts. I encourage you to take up the cause and join us. Together, we can make a real difference.

Sean Southey
Chief Executive Officer, CWF

RED FOX AND WOODLAND CARIBOU
SOUTHERN NEWFOUNDLAND

"The curiosity of a red fox was matched by this young woodland caribou stag. Upon spotting one another at a distance, they approached to within feet for a friendly investigation."

Photo by Mark Raycroft

Marek Stefunko | iStock / Getty Images Plus via Getty Images

Let's be honest. Bats are misunderstood animals.

They're often portrayed as scary, bloodsucking, rabies-infested flying rats – and that's being kind. The truth is, there are plenty of reasons to appreciate, and even LOVE, bats. For starters, they're really good at pest control. Some can eat up to half their body weight in insects in a single night. They have the skills to "see" in the dark (echolocation, anyone?). Even their guano (bat droppings) is helpful as a nutrient-rich natural fertilizer. Here's the only truly scary thing about bats – right now, eight of Canada's 19 bat species are at risk of extinction – gone forever as a direct result of White-nose Syndrome and harmful human activity.

Eliminate the fear. Learn more about Canada's bats and what you can do to help them survive.

Visit HelpTheBats.ca.

CANADIAN WILDLIFE FEDERATION

WAYNE LYNCH

PILEATED WOOD-PECKER

SCIENTIFIC NAME
Dryocopus pileatus

REGION
Widespread in forested areas from Vancouver Island to Nova Scotia but absent in Newfoundland.

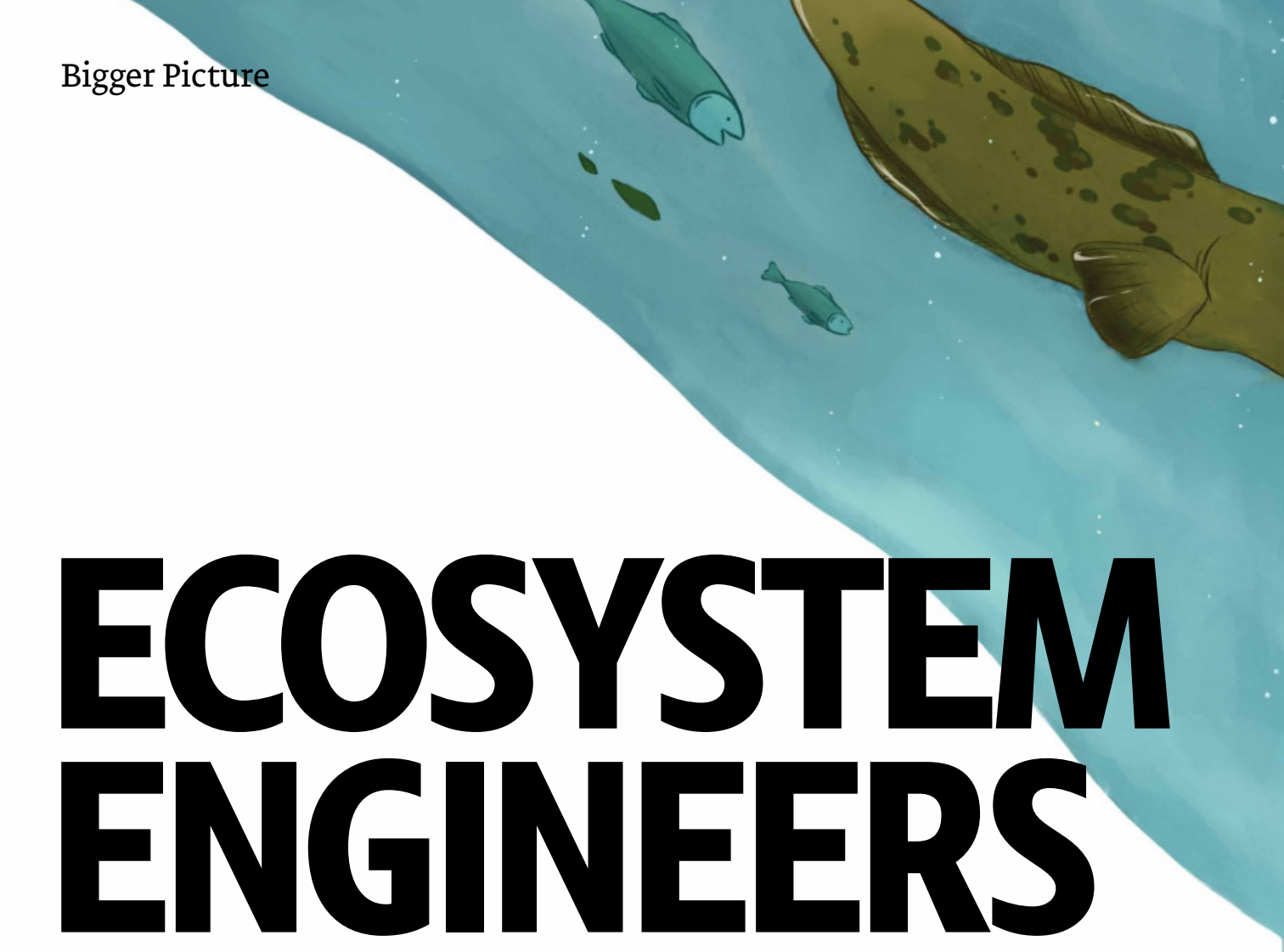
CONSERVATION STATUS
Least concern

WHY SO SPECIAL?
Unintentionally makes sought-after homes for its neighbours

THE CROW-SIZED PILEATED woodpecker is a year-round resident of woodlands throughout the country and the largest woodpecker in North America. This hefty hammerhead typically mates for life. Every spring, crucial courtship behaviour includes excavating a new nest cavity, strengthening the bond between a pair.

Pileated woodpeckers also dig out extra cavities and use those or cavities dug in past years as nocturnal roosts. They may have more than 40 cavities in their defended territory, most of which they don't use. An abandoned cavity can last 20 to 30 years, and so many of the woodpeckers' neighbours depend on these vacant cavities to raise their own families. The temporary lodgers include buffleheads, wood ducks, and common and hooded mergansers, as well as boreal owls, saw-whets and northern pygmy owls. Northern flying squirrels are also enthusiastic tenants, as are several species of bats.

In many woodlands, tree cavities can be in short supply, and so the annual nesting excavations of pileated woodpeckers have earned them the designation as a keystone species because so many other species depend on them to raise their young. The activities of pileated woodpeckers enrich the biodiversity of every woodland in which they live.—**WAYNE LYNCH**



ECOSYSTEM ENGINEERS

On Vancouver Island's western coast, a tangled web of climate stressors is reshaping a rich marine ecosystem — starting with the seaweeds that hold it all together

By Alanna Mitchell Illustration Jaimie Shelton

THE WESTERN COAST OF VANCOUVER ISLAND IS BURSTING WITH life. The California Current sweeps up from the south, and the Alaska Current drives down from the north, making it one of the busiest marine areas on that side of the continent. You can find sea otters, Dungeness crabs, geoduck clams, lingcod, glass sponges and smooth pink shrimp among multitudes of others.

Kelp and other seaweeds support the whole show, anchoring the living space of the others. These marine plants are so ubiquitous, so familiar to coastal humans, that many bear fanciful names: feather boa kelp, splendid iridescent seaweed, winged kelp and bladderwrack.

One of the great questions is precisely how the growing carbon load in the atmosphere will affect such a bustling, productive coastal area. While scientists have tracked many of the ways climate disruption will disturb creatures of the land, they are still investigating how it will affect the complicated marine sphere. Among the individual marine dangers: higher water temperatures, lower water pH, more storms, rising sea levels, less dissolved oxygen, changes to water circulation and connectivity.

Worse, though, is what happens when those climate threats interconnect and reinforce each other. How to begin to work that out? Now, researchers led by Kai Chan of the University of British Columbia have come up with a way of doing it using the western coast of Vancouver Island as a case study. They call it the "pathways of effects" model, and it integrates the results of 126 studies assessing warming, acidification and storms in that area or the effects on its species over time.

Their study, published in March, found that most species were affected in multiple, sometimes contradictory, ways and by several climate stressors at once. In all, they identified 155 different ways that climate

THESE BIG MARINE PLANTS PLAY A ROLE IN HOW FAST AND IN WHAT DIRECTION OCEAN WATER FLOWS, WHERE LIGHT PENETRATES AND HOW OXYGEN AND NUTRIENTS MOVE THROUGH THE WATER.

disruption is affecting the region's species across a dozen biological categories, from genetic diversity to behaviour to abundance to sheer survival. It's a bewildering, complex tale of woe.

Take those seaweeds and kelp, stalwarts of the seascape, known as macroalgae. Ocean acidification, a chemical reaction that happens as sea water absorbs excess carbon dioxide from the atmosphere, makes those feather boa kelp and splendid iridescent seaweed grow. But it also changes the chemical composition within the tissues of black pine seaweed, which can have unknown knock-on effects on the creatures that feed on it.

The greater prevalence of storms can rip up batches of splendid iridescent seaweed and reduce the diversity and complexity of the creatures that live in giant kelp forests, while leaving sea cabbage kelp, with its iron grip, to thrive. That means the makeup of marine communities is shifting.

But it's the rising temperatures that have the biggest effects. From 1935 to 2016, the summer sea surface temperature along the island's coast increased by 0.67 to 0.78 C as the water soaked up extra heat trapped in the atmosphere by gases. The temperature continues to rise today. As well, the northeast Pacific Ocean began experiencing deadly heat waves in 2014.

That extra heat is having a devastating effect on some macroalgae. The flat pompom kelp cannot enter its reproductive phase when the water is too warm, nor can winged kelp or bladderwrack. Not being able to reproduce is the definition of death. So it's no surprise that the numbers of many of these big marine plants are dropping.

As some species die out, others take their place. For example, red turfy seaweeds pushed out kelp forests and their life-supporting canopies in Barkley Sound, south of Ucluelet, during the marine heat wave that lasted from 2014 to 2016. The invasive Japanese wireweed, which can tolerate heat, has begun to spread.

These big marine plants are what's known as ecosystem engineers, meaning they are nurseries and housing for many other species. But they do far more than that. They also play a role in how fast and in what direction ocean water flows, where light penetrates and how oxygen and nutrients move through the water.

Their changes indirectly affect the life they support, in ways that are still unfolding. But at the same time, all those other creatures are also being directly affected in their own ways by climate change, as Chan's fascinating study also shows.

I can't help dreaming of a different future, where we won't need pathways of effects models that can be pressed into use to manage the mess we've made. Instead, I want to be in a world where we have lowered carbon concentrations enough that seaweed and kelp and all that other marine life can simply thrive.

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World of *wonders*

After years of delay, a South Okanagan-Similkameen national park reserve is edging closer to reality. The park would protect Canada's only semi-arid desert, home to dozens of species at risk. It would also add to existing conservation areas and provincial parks in the area and build on local stewardship efforts to protect the fragile landscape

By Andrew Findlay

STEVE OGLE/ALL CANADA PHOTOS

RICH WHEATER/ALL CANADA PHOTOS

It's springtime at Skaha Bluffs Provincial Park above Penticton, B.C., and the rock climbers have arrived. The morning sky is a deep blue, a perfect mirror of Skaha Lake, which sparkles at the foot of Mount Christie. It's prime climbing season, before the heat of a long Okanagan Valley summer sets in and turns this mountainside into a frying pan.

Up on Red Tail Wall, a half-dozen climbing parties uncoil ropes and unload packs at the base of the cliff. More climbers arrive. By mid-morning, the entire vertical sweep of Red Tail is festooned with ropes.

Howie Richardson hikes a trail below the cliff, binoculars slung around his neck. He stops to chat with a group he knows, then moves on. Richardson has one foot in the world of adventure sports and the other in conservation. He's a local rock-climbing legend (some refer to him as the "godfather of Skaha") and a professional biologist.

As a young man, Richardson learned to climb in England before moving in 1972 to Keremeos, a breadbasket community of orchards and vegetable farms along the Similkameen River not far from the United States border. The search for quality rock around his new home was fruitless at first.

"Most of it was junk," he says.

Richardson heard of cliffs high above the eastern shore of Skaha Lake. On a cold fall day in 1987, he and a friend hiked up through the sagebrush, ponderosa pines and grasslands to investigate. Snow dusted the landscape. They were awestruck. Clean and solid gneiss, a type of metamorphic rock, formed a series of canyons and escarpments up the slopes of Mount Christie in a seemingly limitless supply of rock. Best of all, it was untouched except by nesting birds, rattlesnakes, Rocky Mountain bighorn sheep and other critters that shelter among the crags.

"The further and further we went, the more cliffs we found. It felt like we had found the motherlode," Richardson recalls.

This was before the era of sport rock-climbing routes with permanently fixed bolts in the rock face, so Richardson and his friend shouldered a climbing rope and packs full of carabiners, slings, camming devices and steel stoppers that can be placed in cracks to protect a fall. They found a crack, climbed it and named it Primus. It was an obscure route. Richardson admits it rarely gets climbed anymore, but this lonely climb triggered a gold rush of first ascents.

High-quality rock in such a beautiful setting would quicken the pulse of any climber. Richardson appreciated Skaha Bluffs for much more than vertical pursuits: from a biologist's perspective, it is a world of wonders. His 2012 guidebook, *Skaha Rockclimbs: A User's Manual*, is sprinkled with dry humour that betrays his British roots, as well as important information and advice about how to tread lightly in a sensitive ecosystem. The crags, and the surrounding grassy hillsides, wetlands and forest groves, harbour a host of endangered and threatened species, like California bighorn sheep, western screech-owls, white-throated swifts, canyon wrens, Lewis's woodpeckers, four bat species and five snake species.

"It's such a beautiful place. You can be in one of those canyons and not even hear the city even though it's just a few kilometres away," Richardson says.

Following his pioneering Skaha ascent, it wasn't long before word got out. By the early 1990s, a few thousand climbers were roping up at Skaha Bluffs every year. Conservation groups were taking an interest. The Nature Conservancy of Canada and the Land Conservancy of BC would lead an effort to buy 310 hectares of ecologically sensitive private land and create a conservancy. In 2010, the group transferred the conservancy to the provincial government after the creation of Skaha Bluffs Provincial Park on adjacent land. These days, BC Parks trail counters at the three main trailheads log more than 100,000 climbers, hikers, trail runners, dog walkers and other park visitors every year.

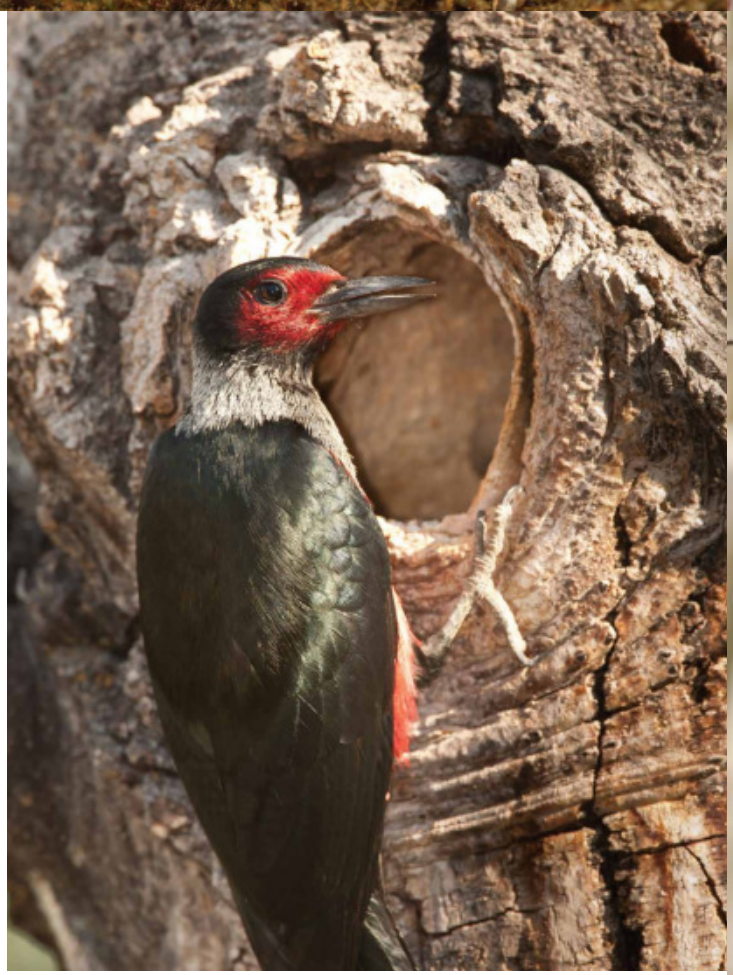
And with growth comes challenges.

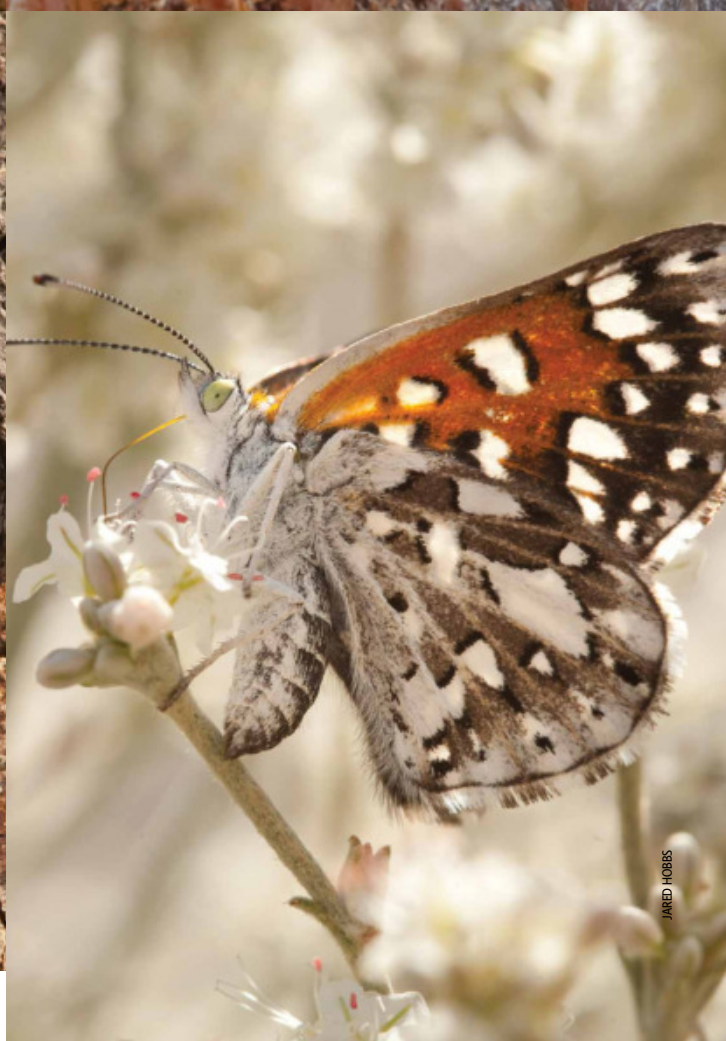
Skaha Bluffs is an ecological snapshot of the Okanagan and Similkameen valleys of southern British Columbia, a semi-arid region home to one of Canada's highest concentrations of listed species. Geographically, it belongs to the Western Great Basin, a vast region of low annual precipitation, hot summers and mild winters that unfolds from

This page: Howie Richardson. Opposite: California bighorn sheep (top), Tiger salamander (bottom).

KAARE IVERSON

WHEN PEOPLE GET UP CLOSE AND PERSONAL WITH THIS LANDSCAPE, THEY QUICKLY REALIZE IT IS ANYTHING BUT VACANT





JARED HOBBS

Opposite, clockwise from top left: Great basin spadefoot, western screech-owl, Mormon metalmark, Lewis's woodpecker

The semi-arid Okanagan and Similkameen valleys are home to one of Canada's highest concentrations of listed species

Mexico north for more than 2,000 kilometres before poking across the U.S.-Canada border in the southern Okanagan Valley. Within an hour's drive, a visitor can experience a parched ecosystem reminiscent of the Sonoran Desert with antelope brush and fragrant sagebrush, then enter golden hills of bunchgrass that might be Saskatchewan before heading to the canyons of Skaha Bluffs or the highlands of Mount Kobau, which could pass for the Rocky Mountain foothills of Kananaskis Country.

The same sunny, hot Mediterranean-like climate that fosters such fascinating plant and animal biodiversity makes it an attractive place to live and visit. It's the heart of B.C.'s wine, golf and beach country, and as the tentacles of development reach farther up the hillsides, this ecosystem shrinks and becomes ever more fragmented.

This fragile landscape has been on Parks Canada's radar for decades. The federal government agency considers it an important — and missing — piece in the puzzle of national parks that aims to protect all 39 ecoregions representative of the Canadian landscape. For nearly 20 years, efforts to protect a portion of this ecologically rich grassland landscape as a national park have started, stalled and restarted. In the summer of 2019, the long-discussed South Okanagan-Similkameen national park reserve took one big step closer to becoming a reality with the signing of a memorandum of understanding between the provincial government, the federal government and the Syilx Okanagan Nation, which represents seven Okanagan-area Indigenous communities in B.C. and one in Washington state.

By Canadian national park standards, the proposed park would be among the smallest, at roughly 270 square kilometres, just 1/25th the size of Banff National Park. Starting about 15 kilometres south of Skaha Bluffs, it would be composed of land around Spotted Lake, Mount Kobau and Kilpoola Lake west of the Okanagan Valley between Osoyoos and Oliver and include BC Parks' South Okanagan Grasslands Protected Area. Most importantly for conservationists, more than 30 federally listed species at risk and 60 provincially listed species live within these theoretical boundaries. Six years since the memorandum was signed, negotiations continue to finalize the park boundary, after which more public consultations will be required to formally establish the park and create a management framework. Creating a national park is a long game.

In the meantime, an array of conservation groups work doggedly to protect and recover species and habitat. Perhaps more than any other animal, the burrowing owl symbolizes the plight of wildlife in and around the Okanagan and Similkameen valleys.

Round-headed with yellow eyes, a white throat and a brownish half-collar, burrowing owls are unusual among owl species. They eat both insects and rodents and nest in the abandoned underground burrows of badgers, coyotes and ground squirrels, rather than tree cavities or branches. Though they migrate in winter to the southern U.S. and Mexico, B.C.'s burrowing owls historically return to breed and nest among very small strips of valley-bottom grasslands. These are where late 19th-century settlers homesteaded and ranched, farmers planted the first fruit trees, orchards and vineyards blossomed, communities flourished and highways were built. This rapid conversion of natural habitat didn't go well for the owl and many other species. By 1980, burrowing owls were deemed extirpated from the province.

For more than 30 years, the Burrowing Owl Conservation Society of BC has run a captive breeding, wild release

This page: Prickly pear cactus. Opposite: Night snake (top), ponderosa pine (bottom).

and landowner outreach program. Since 1992, the society has released 2,150 burrowing owls bred at three centres, in Oliver, Port Kells in the Fraser Valley and the Kamloops Wildlife Park.

More than 3,000 owlets have been born from released owls or owls that have returned. Thanks to these efforts, they are making a slow recovery. However, the real measure of success is the return rate for owls coming back to breed, which sits at around nine per cent, or between eight and 20 individuals every year. By this metric, they are not yet out of the woods.

"I would say we're successful in the fact that we can breed them, we can release them, they produce out there, some do migrate and some come back. We're just not at that sustainable point," says Lauren Meads, the society's executive director and lead biologist.

On a morning in early April, Meads hikes with a field assistant through bunchgrass in the rolling hills near Oliver. Following coordinates on her GPS, she's searching for an artificial burrowing-owl burrow made from plastic pipe.

"We check as many of the burrows as we can, making sure they're in workable condition and not all filled up with dirt. If it is, we flag it, and we try and tackle that later. And then we're also seeing if any owls have come back," Meads explains.

They have their work cut out for them. Over the years, staff and volunteers have installed roughly 1,500 artificial burrows between the Nicola Valley near the town of Merritt and the southern Okanagan. In mid-April, with fingers crossed, Meads and her team released the most recent parliament of 25 breeding pairs. Like making a national park, bringing back burrowing owls is a long-term effort. Success for most threatened and endangered plant and animal species in the region depends largely on habitat protection and landowner cooperation.

These owls have one ace in their favour: charisma. People gravitate to their cause. There's even a winery named after them, the Burrowing Owl Estate Winery, whose owners are longtime financial supporters of the conservation society. The winery often hosts a resident burrowing owl on a perch in its gift shop (the runt of a captive-bred litter that wouldn't have survived in the wild) and a volunteer from the conservation society to talk with guests about this iconic raptor.

Not all South Okanagan species have similar charisma. In the past, public ambivalence was their worst enemy. There is no hug-a-prickly-pear-cactus or save-the-long-toed-salamander movement to stir the emotions that people feel when standing among towering coastal old-growth cedars or watching a grizzly bear from the safety of a viewing platform. According to Meads, people have tended to view sagebrush, grasses and antelope brush as a sort of expendable wasteland, easy to bulldoze and develop into housing or vineyards, vacant land awaiting conversion to suit human needs. It's why so much of this habitat has become

RICHARD CUMMINS/ALL CANADA PHOTOS

AS THE TENTACLES OF DEVELOPMENT REACH FARTHER UP THE HILLSIDES, THIS ECOSYSTEM SHRINKS AND BECOMES EVER MORE FRAGMENTED

DON JOHNSTON/ALL CANADA PHOTOS, JARED HOBBS

Opposite, clockwise from top left: Canyon wren, pygmy short-horned lizard, California quail, yellow-bellied racer

In grassland country, you have to put in the effort to truly appreciate it. If you do, the quiet and amazing diversity is breathtaking

"people habitat," she says. But when people get up close and personal with this landscape, they quickly realize it is anything but vacant.

"It's different than a forest when you're looking up at these big trees and are in awe," Meads says. "I feel like with the grasslands, you really have to get down and look at it closely and see all the little plants and the little flowers and appreciate that it's just as abundant as an old-growth forest."

Attitudes are changing though. Landowners who once saw grassland inhabitants like badgers and burrowing owls as a nuisance — hazards that can break the leg of horses or cattle — now increasingly see them as co-habitants, creatures to live with, not without. Events like the Meadowlark Festival, held every May since 1998, have gone a long way to build a greater appreciation among locals and visitors of the southern Okanagan's ecological riches. Private property owners have become some of the conservation community's biggest allies. Nurturing conservation partnerships is the focus of the Okanagan Similkameen Stewardship Society.

"In the Okanagan and Similkameen, about 50 per cent or more of the valley-bottom land is privately owned or managed. Those valley bottom areas are really where the species at risk are concentrated and also where some of the highest real estate values are," says Lia McKinnon, the society's stewardship biologist. "Basically, our stance is that we can't afford to buy it all, and there's lots of important wildlife habitat in private hands. So, we help landowners to do the best that they can for wildlife on their properties."

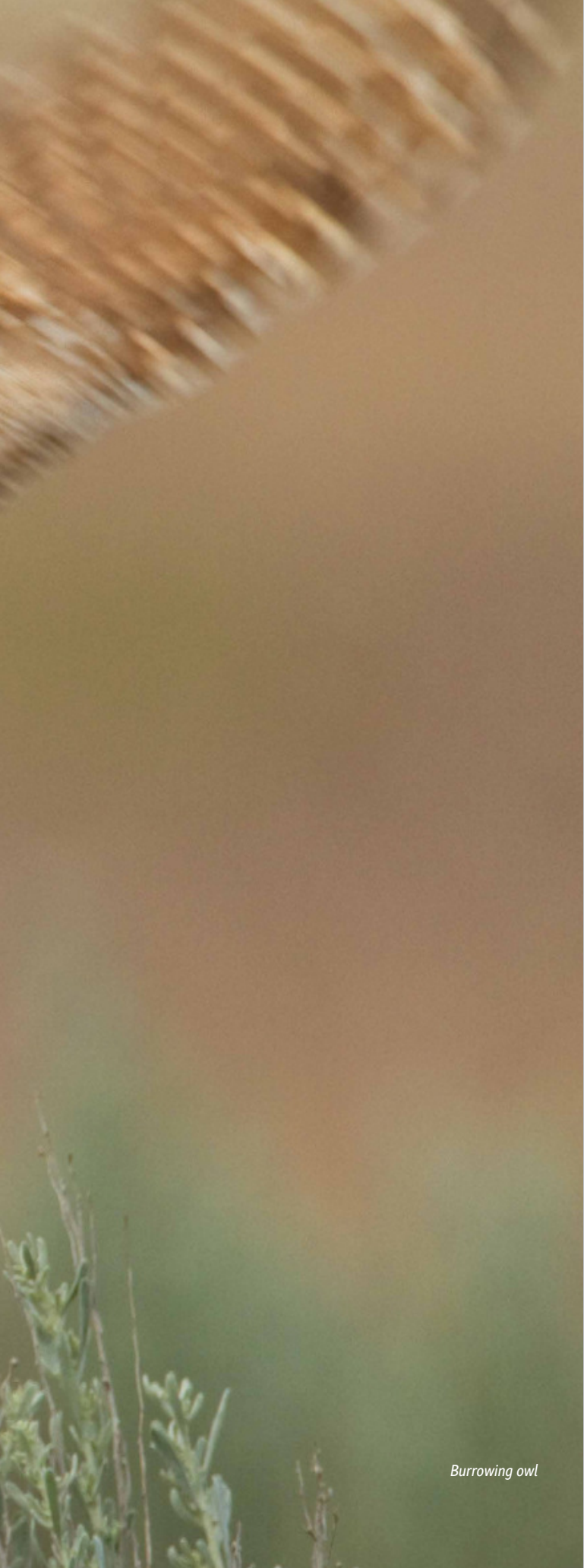
It's entirely voluntary and depends on landowner buy-in and intention — and it's working. Since its inception in 2013, the society has enlisted more than 150 stewardship partners for projects that range from large-scale rewilding of acreages to small backyard biodiversity efforts. For example, McKinnon worked with Okanagan Crush Pad Winery in 2016 to restore a seven-acre hayfield prone to flooding into a riparian forest and wetland. It involved planting black cottonwood, an important tree that once formed extensive forest ecosystems along the Okanagan and Similkameen rivers and many other waterways. This important flood-tolerant tree not only provides critical nesting habitat for the endangered western screech-owl, but it also serves as a cool and shady refuge for many other species seeking shelter from the baking summertime heat. Yet an estimated 85 per cent of the region's black cottonwood forest has been lost to urbanization and agriculture.

Another stewardship partner owns a house on a quarter-acre lot in downtown Penticton next to Penticton Creek. Not long after purchasing the property, the owner called McKinnon after noticing the song of Pacific chorus frogs, also called tree frogs, coming from her backyard swimming pool.

"She would hear the frogs in the swimming pool, but she was just horrified that they were dying because it was chlorinated and there was no way for them to get out," McKinnon says. "So, the next year she closed the pool down and turned it into a wildlife pond."

Pacific chorus frogs are one of seven amphibians native to this hot climate. All are threatened by a loss of nearly 90 per cent of historical wetland habitat, according to the stewardship society. Another is the great basin spadefoot, which, despite appearances, is neither a true frog nor a true toad. Its distinguishing features are spade-like spurs on the hind feet that it uses to burrow into soft sandy soil, where it spends most its life. Though it's rarely seen, the great basin spadefoot is no less important from an overall biodiversity perspective.

JARED HOBBS.



Burrowing owl

Like making a national park, bringing back burrowing owls is a long-term effort

For McKinnon, who grew up in the Okanagan Valley, every effort matters, even swimming pool-sized habitat enhancements. Working to protect threatened species and habitat gets her out among the sites, sounds and smells of a landscape she loves.

"It's just such a special ecosystem for me. When ponderosa pines bake in the sun, they give off a smell like vanilla," McKinnon says. "Walking through a ponderosa pine forest that's been warmed by the sun is like the smell of home to me."

Back at Skaha Bluffs, the people-shy rattlesnake slithers into a rock crevice as a group of chattering climbers passes nearby on a dusty trail bound for the parking lot. Open grasslands between cliffs turn golden in the soft evening light. Hillsides reaching toward the forested heights of Mount Christie are awash in the brilliant yellow glory of blossoming balsam root. The insectivorous white-throated swift, which belongs to one of only a few hundred mating pairs in Canada, zooms between canyon walls on the hunt.

It truly is a world of wonders. Don Gayton is a grasslands ecologists who has lived in Canada since the late 1960s. He has authored numerous books including *The Wheatgrass Mechanism*. For the last 16 years, he has lived in Summerland, on the west shore of Okanagan Lake. He calls grasslands "the Rodney Dangerfield of ecosystems."

"They get no respect," he says. "In mountain parks, the scenery with all the waterfalls, glaciers and mountains does all the work for you. In grassland country, you have to do the work and get down on your hands and knees to truly appreciate it. If you put in the effort, the quiet and amazing diversity is breathtaking."

Slowly but surely, the flora and fauna of the Okanagan and Similkameen valleys are getting the attention and protection they are due.

The Darker Side of Light

How artificial light reshapes the night for wildlife

By Niki Wilson Illustration Joel Kimmel

On the clear nights of her youth in the 1990s, Liz Perkin looked up and saw the Milky Way stretching across the sky. The gas and dust of our galaxy curled around a luminous white band, while millions of stars revealed themselves in the darkness of her family farm southeast of Portland, Oregon. But as Perkin grew up, so did Portland. The city's population has almost doubled since 1990, and with that has come an increase in the light it emits. From the farm, Perkin watched in frustration as the details of the Milky Way faded against the glowing metropolis.

It was obvious to Perkin that light pollution had become a problem for people trying to connect with or study the cosmos. (It's estimated more than 80 per cent of people live under light-polluted skies.) But it wasn't until graduate school that she

began to think about how artificial light at night might affect the aquatic species and river systems she studies. At the time, very little research had been done on fish and artificial light. For Perkin, now a fish biologist with the Oregon Department of Fish and Wildlife, it was both daunting and exciting. "What an opportunity to be one of the first people to explore and set the agenda," she says.

Perkin is one of a growing number of researchers trying to understand how an ever-increasing amount of artificial light at night affects the planet's wild residents. Studies from the early '90s alerted us to how artificial light disorients migratory turtles and causes birds to strike the silvery glass of tall buildings. But in the last decade, the list of species known to be affected has grown significantly. The list even includes urban soil bacteria — city lights have been shown to affect soil bacteria communities and potentially upset the nitrogen cycle.

As research results roll in, it's evident that artificial light at night affects wildlife behaviour, physiology and navigation. But it's not the same across the board. Some species are more sensitive than others. For some, different wavelengths of light are more disruptive than others. A lot of it depends on how animals evolved to live in a darker time on this planet.

Long-distance bird migrants, such as indigo buntings, learn to use the stars as a compass to navigate

For millions of years,

life on Earth has adapted and attuned itself to the cycles of the sun, moon and starlight. During the full moons of South American summer, black swifts ascend to heights of almost four kilometres above the Amazon Basin, using the extra-bright light to find and feast on insects. The period of darkness between sunset and moonrise that occurs after a full moon starts a countdown to an ocean breeding bonanza in the tropics — days later, coral polyps release an underwater blizzard of eggs and sperm. Long-distance bird migrants, such as indigo buntings, learn to use the stars as a compass to navigate their way to nesting and wintering sites.

The daily turn of the planet has led to the development of circadian clocks that allow wildlife to anticipate the light, dark and many levels of low light in between. Darkness is critical to species across the globe — 30 per cent of all vertebrates (animals with skulls and spines) and 60 per cent of those with exoskeletons are nocturnal. Many of these species have evolved adaptations to the night.

The fur of the flying squirrel, for example, glows fluorescent pink in ultraviolet light. It's a trait unique to them in the family of squirrel species and rare among mammals. The colouring may help them navigate, communicate or blend in with their surroundings — it's something researchers are trying to figure out. What is certain is that it's a wavelength most of us humans don't see, highlighting one of the ways many species differ from humans in their perception of light.

Adaptations to vision are common in nocturnal species. Many fish can see ultraviolet light, which may help them find mates flashing UV-reflective patterns or feast on zooplankton that reflect UV light. “Fish are able to see and be active at light levels that seem very dark for us,” says Perkin.

To the human eye, a streetlight 100 metres away from a river may not appear to cast much light on the water, but that light can change the environment for fish. Light streaming from bridges into waterbodies can serve as a kind of fence that prevents nighttime movement, says Perkin. And in places where there is no longer true darkness, fish may miss important cues. Many salmon move along migration routes during new moons when the sky is at its darkest, she says. “If you never have that low light level, if you’re always at the level of full moons, how is that affecting the timing of migration?”

To the human eye, a streetlight 100 metres away from a river may not appear to cast much light on the water, but that light can change the environment for fish

Artificial light has

also been shown to affect relationships between species. “One of the main drawbacks to adding light is that it really changes predator-prey interactions,” says Perkin.

Along with project lead Roger Tabor of the U.S. Fish and Wildlife Service, Perkin was on a team that investigated the impact of different colours of shoreline lighting on the relationship between juvenile salmon and their predators in the shallow waters of Lake Washington, near Seattle. They found the young fish were attracted to the lights, regardless of colour. Local predators like great blue herons took notice, feasting on the well-lit salmon buffet. And though the herons might benefit from the extra food, says Perkin, they are potentially trading the calories for the harm that comes with lack of sleep and hormonal disruption.

The shifting relationships between predator and prey are complex. Light is potentially expanding the niche of some animals and limiting that of others, says Perkin. Animals that used to be active only during the day might expand their activity into the twilight and dark hours. Some species may use light as a “predator shield,” says research ecologist Mark Ditmer of the U.S. Forest Service Rocky Mountain research station in Fort Collins, Colorado.

Ditmer and his colleagues explored the relationship between cougars and mule deer living with different levels of artificial light at night across Arizona, Nevada, Utah and California. Their sites included intensely lit areas near Reno, Las Vegas and Salt Lake City, all the way across the continuum to the dark heart of the desert. They found that deer living in brighter, urban areas were more active at night than deer in darker places. Cougars appeared wary of the brightest areas around big cities, affording the deer some protection as they foraged. But the cats weren’t far away. Cougars ambushed deer from the darkest locations in the transition zones where the bright lights of the city meet the wildlands beyond, explains Ditmer.

The study revealed the degree of light mattered. “The more illuminated the landscape, the more cougars avoided the light,” says Ditmer. Exposure to areas with bright light also mattered: cougars and deer less used to lights increasingly avoided illuminated areas, while deer living in the well-lit city

outskirts were drawn to the brightness. In other words, both species made risk trade-offs based on their experience and tolerance for light.

Many other species make these kinds of trade-offs between light and dark, but some are forced to confront the issue more than others. Bats are more likely to encounter artificial light at night due to their wide-ranging movements on nightly feeding missions and during migration between roosts. Still, not all bats respond the same.

Little and big brown bats, for example, appear to be significantly disturbed by artificial light at night, says Cami Hurtado, bat hub coordinator for the non-profit group Services for Environmental Sensor Research. The effects of artificial light at night on these species extend well beyond the area intended to be lit: up to 75 metres away for little browns, and 25 metres for big browns. It's a potential source of habitat loss.

Larger migratory species are also affected. Artificial light appears to alter the activity patterns related to lunar cycles in hoary, silver-haired and other bats. Conversely, migratory bats also appear to be more light tolerant and may actually exploit areas where insect prey congregate around lights, says Hurtado. But will those insects be there forever?

City lights have been shown to affect soil bacteria communities and potentially upset the nitrogen cycle

Until recently, insects

were largely ignored in studies on light at night. But at Juli Carrillo's plant-insect ecology and evolution lab at the University of British Columbia, this kind of research is critical in helping farmers maintain insects that benefit both agriculture and native plants.

"Here in the agricultural lands that surround Vancouver, we have lots of greenhouses, including on UBC campus," says Carrillo. "The greenhouses are often lit up at all times of the day and night. You'll see these crazy pink glows that diffuse into the sky around them. People are quite concerned about it," she says. The pink light comes from a combination of red and blue LED light that optimizes both energy efficiency and photosynthesis. But the greenhouses are significant sources of artificial light at night.

Carrillo jokes that some people compare the mass of bizarrely lit structures to what an alien invasion might look like. "It disrupts people's sleep, but these greenhouses are likely having huge impacts on the insects in those environments as well."

One of these potential impacts is on the pollinators of blueberries. Blueberries are an economically important crop in the area — one thought to be primarily pollinated by bees. Carrillo's student Hannah Anderson recently discovered that moths could also be an important pollinator, dusting their furry bodies and faces with pollen likely as they visit the flowers at night. But when distracted by artificial lights like those from the greenhouses, the moths "may not be pollinating the wild plants or the blueberry plants and other crops in the environment," explains Carrillo. The light disorients them.

As Hurtado suggests, moths are more vulnerable to predators like bats — and not just when they are circling lights. They are vulnerable when they are trying to hide, too. "You don't see very many moths during the day. That's because they're good at camouflage," explains Carrillo. However, she says the way the moths perceive colour under artificial light means they'll often hide on surfaces where they're not camouflaged at all.

It's no surprise that insects are affected by artificial light. They've been on this planet for the better part of 500 million years, says Daphne

Chevalier, research technician and former student in Carrillo's lab. "It's just unbelievable how much their worlds have changed in such a tiny span of time, especially if you think about nocturnal insects and just how sensitive they are to tiny differences in light," she says. Dung beetles, for example, have been shown to determine their direction and rolling patterns using the Milky Way, says Chevalier. When they can't see it, their patterns go haywire.

Like Perkin's research on juvenile salmon, Chevalier investigated how insects respond to different artificial light colours such as white and amber. "We've got a lot of questions swirling around the conservation community these days about whether we can mitigate the negative effects of artificial light at night by just tweaking those colours," she says. Most of the insects and small critters she captured — from large, iridescent-winged carabid beetles to roly-poly isopods — were attracted to light, regardless of the colour. There were some exceptions: springtails, for example (important soil decomposers) were deterred by amber light but attracted to white light.

"It shows how diverse these animals' responses are, and how they see the world completely differently than we do," says Chevalier. Insects "are such a huge, diverse ancient group. We have to start thinking about things from their perspectives, because it clearly affects their behaviour significantly."

Designing studies to assess how artificial light at night affects other species requires us to overcome our own blind spots and look outside of our own sensory experience. Even ecologists and wildlife biologists who are used to considering the world through an animal or plant lens often don't consider the range of implications that come with sensory pollutants like artificial light at night, says Ditmer. This has led to the rise of an ecology specialty — sensory ecology — that strives to understand how animals perceive the world.

When Ditmer partnered with sensory ecologists to analyze how artificial light at night and sound pollution affect birds across North America, the team included measures of bird perception. These characteristics ended up being critical when trying to understand how light and sound affected birds both positively and negatively. For example, birds with better "light-gathering ability" — the ability of each species' eyes to collect and use available light, particularly in low-light conditions — were more likely to have chicks survive and have chicks earlier in the year with increased light exposure. But the early bird does not necessarily get the worm: earlier hatches could potentially create mismatches between when chicks are born and when food is available, says Ditmer.

When describing artificial

light at night, sensory ecologists and astronomers use a specialized vocabulary to describe different kinds of light, using categories like "skyglow" to describe the diffuse glow from city lights that illuminates the night sky, as compared with the reflected light of snow or vegetation, and the spectral composition of light that includes wavelengths like UV.

There are even different kinds of twilight based on the sun's position. Nautical twilight occurs when the horizon is still visible at sea but the light is fading fast. Navigation by stars is possible, and nocturnal animals emerge. Migratory birds such as savannah sparrows use polarized light patterns during twilight — especially nautical twilight — to orient and calibrate their navigational systems.

Astronomical twilight is different: it is the faintest category of natural light: nearly full dark. The stars and planets of the night sky are fully visible, and most animals that are active in the daytime have stopped activity for the rest of the day. This is a great time for bats, when they can easily navigate, but is harder for their predators like owls and other raptors to see, says Hurtado.

There is still much to learn about the sensory world of wildlife, but it shouldn't stop us from acting now on light pollution, says Perkin. The good news is that artificial light at night is unique among many other environmental problems in that it is comparatively easy to fix. Unlike other kinds of persistent pollutants like plastics or heavy metals, artificial light disappears instantly when it is turned off.

Groups like the Royal Astronomical Society of Canada and DarkSky International have commercial and residential lighting guidelines aimed at reducing artificial light at night. Individuals can make small changes to their homes with big results. Strategies include using outdoor lighting that is dimmable, controlling the distribution of light (e.g., fixtures that face downward and have good shielding options) and minimizing blue light.

When buying night lighting, Chevalier suggests buying lights certified with LUNA standards, developed by the DesignLights Consortium and approved by the International Dark Sky Association. She also suggests outdoor lights be on a timer to decrease the length of time they are on. Curtains and window shading that block interior light from escaping to the environment is also helpful.

"Just thinking a little more about lights is important," says Chevalier. "For me, it's helped me see the nighttime as something to be protected — to be able to see the stars and realize how special that is." In that vein, both the Royal Astronomical Society of Canada and DarkSky International promote the designation of dark sky sites and preserves. There are well over 30 dark sky sites in Canada to date, and many more places across the country are still free from constant light, at least for now.

In those places, the ancient rhythms of days and seasons continue. This fall, the fading light of shorter days will signal the snow geese to leave the Arctic for their southern wintering sites. During a new moon, mountain whitefish will migrate from an emerald lake toward a rushing river, their backs flashing silver. Long after the sun sets during the dark days of winter, owls will pluck voles from the snowpack, leaving their feather prints in the snow. Life carries on in the quiet dark, hunting, calling and glowing. When we allow for darkness, we protect not just the stars but entire worlds.

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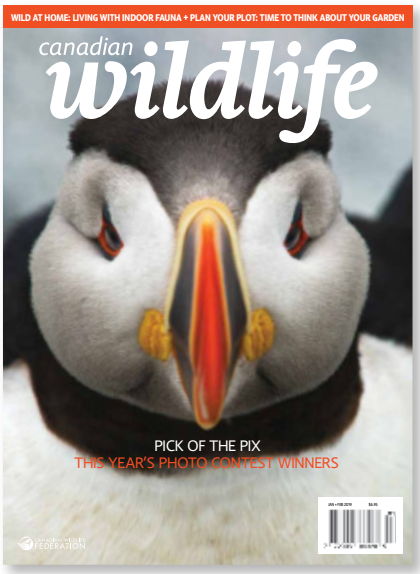
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BIRDING

Hummingbird Hazards

Feeding hummingbirds the wrong way can sicken or kill them. Here's how to keep your backyard visitors healthy and safe

HUMANS HAVE BEEN FEEDING HUMMING-birds with sugar solutions since at least 1947, when the first hummer feeder was patented. But sadly, too many folks who put out feeders are unaware they might be killing these remarkable birds with kindness.

A number of wildlife rehabilitation centres have recently reported an influx of sick and dying hummingbirds with unretractable tongues due to fungal spores becoming attached to the mouth and esophagus. The fungal infection, candidiasis, is caused by a fungus called Candida albicans. When it becomes overly numerous, it can affect the gastrointestinal tract from the tongue to the cloaca, as well as skin and respiratory systems. Other symptoms include poor appetite, inflamed mucous membranes, difficulty with breathing and swallowing, and thick mucous discharge. If the affected bird is treated soon enough by wildlife rehabilitation folks, it has a 50-50 chance of survival. However, you can well imagine how few sick individuals of such tiny birds are found in time or even at all. Dead or dying songbirds are usually quickly picked up by various scavengers.

It all has to do with feeding hummingbirds in an irresponsible manner. Here are a few tips to keep our hummingbirds safe:

First, never offer artificial nectar containing honey, artificial sweeteners or powdered, organic, brown and raw sugars. Boiling one cup of plain, white, refined sugar in four cups of water is the only assured safe way to make hummingbird solution. And don't add red dye colouring to attract the birds. Just like in humans, some of these dyes have been shown to be harmful to hummingbirds. The red parts on the feeders work just fine to attract the birds. For these reasons, I choose not to buy pre-mixed hummingbird nectar in stores. I like to know what I am giving my hummers.

Equally important is keeping feeders clean and hygienic and not allowing dangerous fungi to grow in the solution. If possible, try not to hang the feeders in direct sunlight. I recommend taking the feeders down every four or five days to scrub clean with a stiff brush in hot water and dish soap. Every third wash, you might immerse the feeders in a 10 per cent bleach solution. This also applies to feeders that are hung out in the colder months and warmed with heat lamps.

If you own large feeders, there is no need to fill them entirely. Using a small coffee cup to fill the feeder will induce you to clean and refill them more frequently.

Suspend the feeders with prominently coloured string or wire to minimize collisions with wings whirring sometimes 80 times a second. Position them either within 30 cm of glass windows or at least four metres away to prevent suddenly frightened birds from hitting the glass.

Do not offer just one feeder. Hummingbirds are pugnacious birds and will fight for hours, sometimes to the death, over access to a single feeder. In an ideal world, I suggest hanging two feeders far apart in both the back and front yard. You can buy packages of four feeders the size of large test tubes for $10 to $25 online. It takes about four to five days for hummingbirds to empty them, which is perfect timing for refilling and cleaning. Painting the yellow plastic flowers with red nail polish will also deter wasps, which seem to like yellow.

The bottom line: if you are not willing to take the time to keep your feeding operation hygienic, I suggest taking the feeders down and planting hummingbird-friendly flowers instead.—**DAVID BIRD**

URBAN WILDLIFE

Fox Island

What is black and white, but red red all over? P.E.I.'s highly visible fox population

PRINCE EDWARD ISLAND IS A PLACE of exceptional natural beauty. The 5,660-sq.-km island in the Gulf of St. Lawrence is justifiably famous for its picturesque redness, from vivid hued fields and craggy russet shorelines to Anne Shirley's ponytails.

Red foxes too. They are ubiquitous, town and country. Until coyotes appeared on the island five decades ago, the red fox was the largest (non-human) carnivorous mammal in P.E.I. It still has the highest profile.

Vulpes vulpes are "true foxes," part of the genus Canis (along with domesticated dogs, wolves, coyotes and jackals). They are smaller than these relatives (weighing just 5 to 10 kg), their skulls flatter, their tails longer and bushier. The typical lifespan is about four years in the wild, but in the right circumstances they will live up to a decade. Males are called tods, females are vixens, and the young are kits. They are usually found in pairs or small groups, as the young of a mated pair will remain with them for a period and help care for new kits. Red foxes feed on small rodents as well as squirrels, rabbits, game birds and reptiles. Fruits and vegetables are common in spring and summer. Of course, where available, they will rely on human food sources. Predators include larger canines as well as large predatory birds. Humans are responsible for many deaths, largely inadvertently by cars, but also the occasional hunter or trapper.

The red fox plays a unique role in P.E.I. lore. The provincial shield features two foxes *rampant* (up on their hind legs) as supporters, one sporting a collar of potato blossoms, the other a fishnet. (At the top, an insouciant blue jay *regardant* — with its head turned back — wears a crown.) The thing is, the red foxes on the provincial shield are black.

Here's why. It is not uncommon for genetic variations among red foxes to result in a black- or black-and-silver-coloured coat once in a while. In the late 1800s, P.E.I. had a typical red fox population, with variants appearing occasionally. There's a popular fox museum in Summerside that explains what happened next. In the 1890s, European couture houses became enamoured of fox fur, particularly black and silver fox fur. A pair of enterprising businesspeople in western P.E.I. recognized an opportunity and set about breeding local foxes for this particular genetic mutation. If you can pardon the (entirely apt) expression, the two made a killing. The industry caught on in P.E.I.: in the 1920s there were hundreds of breeders

BRITTANY CROSSMAN / ISTOCK / GETTY IMAGES PLUS.

across the island. But fashions change, and by the time of the Second World War, the market had disappeared. P.E.I. breeders dwindled to a handful. Still today, many experts attribute the superabundance of foxes on the island at least partly to the escape or release of bred foxes all those years ago.

More recently, there has been another change. In the past few decades, foxes have been much more visible on the island. There are several reasons, of course, including growth in the human population, and the spread of housing and industrial development into former natural fox habitat. Wildlife biologists point also to the arrival of the much larger and more aggressive eastern coyote, which likely began crossing the iced-over Northumberland Strait from New Brunswick beginning in the 1970s. Their presence has driven foxes into closer and closer contact with humans.

Charlottetown is the island's charming and bustling capital, a city of about 80,000 humans — and a growing number of foxes. It is not uncommon to encounter one or more in city streets. It has become such an issue that a University of Prince Edward Island student named Hailey Paynter, now a resource management officer for Parks Canada in P.E.I., led a study to understand these foxes' denning strategies in cities. The results were published in 2024 in the journal *Canadian Wildlife Biology & Management*.

Over two years, the researchers found 98 separate denning sites throughout Charlottetown. About half were in predicable locations (parks, natural green spaces and agricultural areas, generally at least 35 metres away from steady human activity), while 45 sites were in areas of high human density. The researchers conclude that this willingness to live among us is a matter of opportunism: by locating a den near to readily available food sources, the implicit wager is kits are more likely to survive.

As the species adapts to living cheek by jowl with humans, certain tendencies emerge: they are okay with being close to humans, just not too close. They recognize roads are dangerous (mature foxes will look both ways before crossing the street) but also use corridors to move through a complex crowded space that almost invariably leads to human food sources.

The red fox is the most abundant and most widely distributed species of Vulpes occurring throughout the Northern Hemisphere. It is also among the most adaptable. A survey of urban fox studies from around the world showed their actions differ based on where they are. Different cities, different behaviours. Take London, England, home to thousands of foxes: dens are usually in quiet private gardens in residential areas. One study, which used so-called "puzzle feeders" that have to be solved to release food, showed that while London's foxes are much more likely to approach the challenge than their rural counterparts, they are no more likely to be able to solve it. They are bolder but not slyer than their country cousins. In Toronto, a recent study showed that local foxes prefer to establish dens in large public green spaces, such as golf courses, cemeteries, sprawling parks and the city's extensively wooded ravine systems. As reported in a recent issue of this magazine, these areas are also frequented by an increasingly desperate coyote population.

Highly adaptive, opportunistic and clever, Charlottetown's foxes have another advantage in their struggle to survive: they are a treasured part of the city's heritage.—**CRAWFORD SHAW**

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FIELD GUIDE

Pale Showy Goldenrod

Solidago speciosa

A HALLMARK OF LATE-SUMMER landscapes throughout North America, goldenrod is often unfairly blamed for seasonal allergies. It is so much more than a nuisance! Pale showy goldenrod stands out for its striking beauty and its ecological significance. Common in the central and eastern United States, this species is found in only a few spots in Ontario. Its limited distribution in Canada highlights both its ecological value and conservation concerns about the remnants of tallgrass prairie where it grows.

A perennial herbaceous plant in the Asteraceae (aster) family, it is known for its tall, upright stems that typically range from 60 to 120 centimetres. The leaves are alternately arranged and lance-shaped and become progressively smaller up the stem.

What distinguishes *Solidago speciosa* from other goldenrod species is its vibrant and dense inflorescence. It generally flowers from late July through September. The flower clusters are pyramidal and packed with bright yellow florets, giving it

Pale showy goldenrod

Monarch butterfly feeding on goldenrod

a more compact and eye-catching appearance than other goldenrods. Despite its name, "pale" refers to the hue of the stem and foliage rather than the rich golden-yellow flowers.

In Ontario, *S. speciosa* is associated with tallgrass prairie ecosystems, oak savannas and dry open woods — each a rare and threatened habitat type in the province. These ecosystems are remnants of what once formed part of the broader Carolinian forest zone in southern Ontario. Pale showy goldenrod prefers well-drained, sandy or loamy soils and full sun, thriving in open conditions with minimal tree cover.

Goldenrods like *S. speciosa* play a crucial ecological role. Their late-season blooms provide a vital nectar source for pollinators when few other plants are in flower. Bees, butterflies and even wasps and beetles are common visitors. Monarch butterflies, in particular, benefit from goldenrods as nectar sources during their fall migration to Mexico.

Goldenrods also serve as host plants for numerous insect species, including moth larvae and specialized bees. This biodiversity support makes them essential components of any native plant community.

Distribution in Ontario is limited and sporadic. Native to the province, its presence is restricted primarily to the southwest in now-rare pockets of tallgrass prairie and oak savanna — habitats that have been reduced to less than three per cent of their original extent due to agriculture, urban development and fire suppression (by allowing trees and shrubs to grow).

Because of its habitat specificity, *S. speciosa* is a good indicator species: its presence is often a sign of relatively undisturbed or well-managed sites with native vegetation. However, it is also sometimes planted in prairie restoration projects, which can help extend its local range and strengthen native plant communities. Efforts to protect these areas include prescribed burns, invasive species control and native plant propagation. Maintaining and expanding suitable habitat is crucial not only for *S. speciosa* but for dozens of other rare or threatened species that share the same ecosystem, such as the eastern foxsnake (one of the province's largest snakes) and the monarch butterfly.

Gardeners choose *S. speciosa* for its resilience and pollinator benefits: it is drought-tolerant, cold-hardy and resistant to pests and disease. Unlike some aggressive goldenrod species, *S. speciosa* behaves well in gardens and does not spread invasively via rhizomes. Its vertical growth and showy flower heads add height and late-season colour to native plantings. When using it in restoration, it is important to source local seed or plant material to maintain genetic integrity and maximize ecological compatibility.

A striking yet understated symbol of Ontario's dwindling tallgrass prairie heritage, its vivid blooms are not only a visual delight but also a beacon for pollinators preparing for the long Canadian winter. Though not considered rare in its broader range, its Ontario populations are closely tied to ecosystems that are critically endangered.

Protecting and restoring these landscapes is essential for ensuring the survival of *S. speciosa* and the web of life that depends on prairie and savanna habitats. Whether admired in the wild or cultivated in native gardens, this goldenrod is a reminder of what has been lost and a symbol of hope for ecological renewal.—**ALEX PARK**

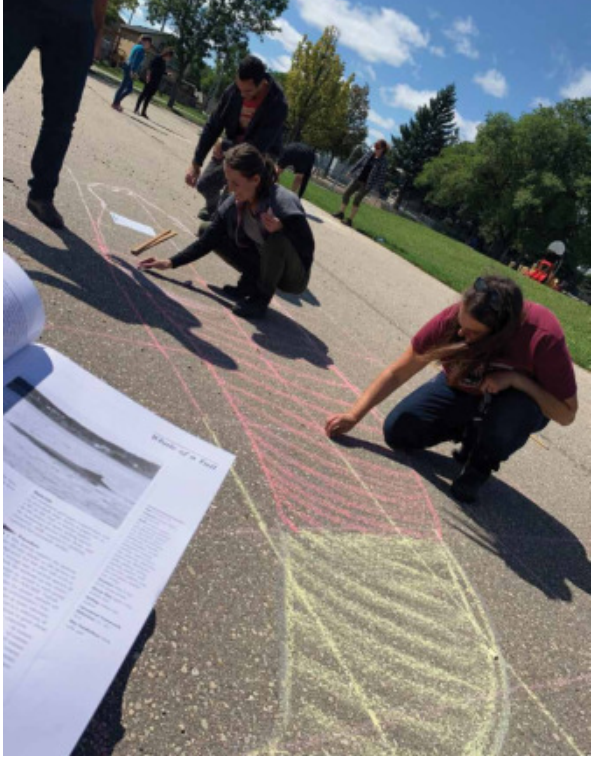
BOB HILSCHER / ISTOCK / GETTY IMAGES PLUS

Mission:

To conserve and inspire the conservation of Canada's wildlife for the use and enjoyment of all.

Throughout our 2024-2025 fiscal year, the Canadian Wildlife Federation continued our steadfast work to advance our five-year strategic plan. Thanks to our generous supporters, we were able to engage educators across the country, providing them with the training and resources they need to bring wildlife into the classroom. Our programs built intergenerational bonds that flourished to create more much-needed habitat through wildlife-friendly gardens. Our conservation science team tackled some of the significant threats facing wildlife like restoring meadow habitat for pollinators, removing barriers to freshwater fish migration and reducing the risk of fishing gear entanglement for large marine animals. All of these accomplishments would not have been possible without our loyal donors who, together with CWF, are creating a brighter future for Canada's wildlife.

CANADIAN WILDLIFE FEDERATION



REX FERGUSON-BAIRD

Here are some highlights of our accomplishments and progress in the key strategic results areas of Strengthening the Conservation Ethic Among Canadians, Inspiring Conservation Action, and Conserving Key Species and Their Habitat.

Strengthening the Conservation Ethic Among Canadians

WILD Education empowers educators with hands-on tools and resources to inspire environmental awareness and stewardship. In 2024-2025, 927 educators received professional development training across Canada including Project WILD and Below Zero workshops. Post-workshop evaluations showed a high impact: educators reported an average confidence level of 88 per cent and rated their experience 4.9 out of 5 stars.

Wild Webinars and Distance Education engages students across Canada through interactive learning. CWF hosted seven school webinars, engaging 5,239 students, and reached an additional 1,469 students through the National Wildlife Week webinar series. The Mission Biodiversity campaign continued into 2025, providing monthly bilingual resources that supported educators in addressing biodiversity threats. To date, 51,715 educational resources have been downloaded from CWF's Online Learning Library.

Environment and Climate Change Canada contracted CWF to develop a new online Canadian biodiversity course for the Canadian School of Public Service, featuring three 45-minute interactive modules: Module 1: Foundations of Biodiversity (What?), Module 2: Importance of Biodiversity (So What?), Module 3: Action for Biodiversity (Now What?). The completed course materials, in both official languages, are now with government platform developers for future deployment.

Since 1963, the iconic Hinterland Who's Who program has been introducing Canadians to the wonders of our natural world through engaging wildlife video vignettes and educational resources. By highlighting key species found across Canada, emphasizing their ecological importance and the need for conservation, HWW continues to inspire generations to connect with nature and take action to conserve habitats. Thanks to the generous donation of airtime from broadcasters across the country, HWW public service announcements aired over 54,000 times for a broadcast value of almost $5 million.

Inspiring Conservation Action

Gardening for Wildlife encourages individuals and schools to create spaces that support local wildlife through sustainable gardening practices. As part of this initiative, in the 2024-2025 fiscal year, 1,085 gardens and 23 schools were newly certified, showcasing efforts to nurture wildlife-friendly environments. Since the garden certification program started in 2002, CWF has certified 7,689 gardens including 431 school gardens.

The WILD Spaces program engages students and communities in hands-on biodiversity education by distributing native plants and fostering connections through sustainable initiatives. In our 2024-2025 fiscal year, the program engaged 10,502 students across 135 schools, distributing 5,600 native plants. The program partnered with 49 school boards and community groups, including 33 seniors' organizations, to create intergenerational learning opportunities. Participating schools spanned five provinces: Alberta, British Columbia, Manitoba, Ontario and Quebec.

The WILD Generations program is a unique initiative aimed at fostering intergenerational connections while promoting environmental stewardship. Launched in 2024, the program partners with senior-serving organizations like Bruyère Village, The Olde Forge, Metcalfe Association, and Rural Ottawa South Support Services to implement community-based environmental projects that bring together youth and seniors to collaborate on gardening, biodiversity education, and habitat enhancement efforts at local schools and residential facilities.

In partnership with Girl Guides of Canada, CWF continues to support the "Act for Nature" National Service Project, which engages youth in conservation action through initiatives such as tree planting, shoreline cleanups and wildlife habitat creation. As of May 27, 2025, the program has been completed by 2,376 girl members, 527 adult members, and 253 non-members, reflecting strong engagement across the Guiding community and beyond. A total of 8,691 Year 1 crests and 5,937 Year 2 crests have been purchased to date, with participation recorded in every province and territory.

CWF leads iNaturalist Canada, part of a global network, which encourages personal engagement in documenting biodiversity through citizen science. Using the iNaturalist platforms, participants upload observations of plants, animals, and other organisms, contributing to a global database that aids scientific research and conservation efforts. Thanks to citizen scientists, over 18 million observations have been recorded on iNaturalist.ca.

DWAYNE BROWN STUDIO

Conserving Key Species and Their Habitat

Freshwater

Partnerships with First Nations in British Columbia and Atlantic Canada continue to present opportunities for achieving CWF's strategic objective to restore fish passage at 30 watercourse crossings across Canada by 2028. We are developing or implementing 15 watershed connectivity restoration plans, with seven led by First Nations. Barriers will be prioritized through these plans by CWF and partners or by their owners directly.

CWF is developing strategies for improving fish passage at the R.H. Saunders Generating Station on the St. Lawrence River, and the Mactaquac Generating Station in New Brunswick, and is working to engage with conservation partners in both locations. Success on these projects would set an important precedent for bringing hydropower into compliance with the Fisheries Act and contribute to CWF's strategic objective of restoring fish passage for priority species at five dams by 2028.

Terrestrial

To date, CWF's Rights-of-Way as Habitat program has successfully restored over 1,795 hectares of native meadow habitat for pollinators with more than 40 partners. We continue to strengthen our program's impact by addressing sector-wide knowledge gaps through new training opportunities and provision of learning resources. This year, CWF released a suite of communications templates to help partners overcome one of the most cited barriers to effective restoration. We also expanded our network into Quebec, launching our first project in the province and piloting organic site preparation methods with broader applicability.

The grasslands program continues with its multi-pronged approach, including the multi-taxa research partnership of the Living Lab program, the grassland awareness project, and the Pronghorn project. The multi-taxa project, with all data collected, is now being analyzed with vegetation and bird data in collaboration with SODCAP and Birds Canada. CWF is leading a Grasslands Coalition in the development of a Grassland Awareness campaign, a dynamic initiative aimed at fostering understanding and appreciation for Canada's grassland ecosystems.

The National Native Seed Strategy is in its second year of implementation, which includes support for the Southern Ontario Seed Strategy, Indigenous community involvement, assessing the seed production capacity across Canada, and refining recommendations for the national strategy.

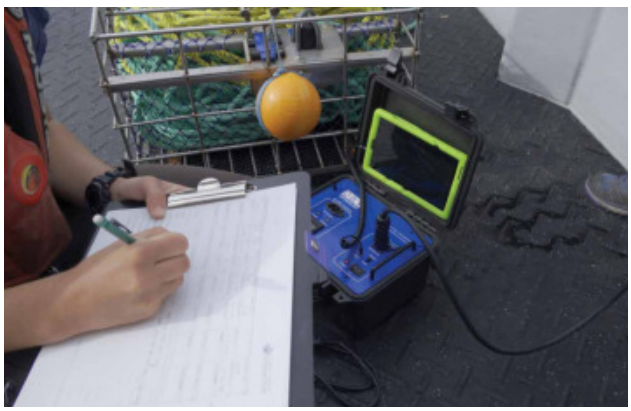
PHOTOS: CWF PHOTO CLUB | CHAD LARSEN; TRACEY ETWELL, CWF; B. REBELLATO, CWF

Marine

The CWF marine program continues to establish itself as a national and global leader in eliminating the danger to large whales from fishing entanglements and vessel strikes. This past year, we responded to several large fisheries closures supporting and training dozens of fish harvesters in the safe and effective use of on-demand gear. We also continue to test new gear innovations and to produce scientific evaluations of the effectiveness of current and proposed fisheries and vessel management measures to ensure these continue to be effective.

As a part of our community engagement, we hosted and facilitated four multi-day community workshops this past year, both in-person on both the east and west coasts as well as through virtual participation. The topics for each focused on reducing the harmful effects of fisheries and vessel strikes on large whales. More than 250 participants from Indigenous communities, commercial and recreational fish harvesters and their associations, academic scientists, regional and national NGOs, and federal government agencies joined in.

Canada's ocean activities continue to kill and severely injure many whales every year. There is so much more we need to do, but we can show progress. We're encouraged by this and by the participation of all members of this community. We are eager to engage and to support Canada's new federal government as their focus on Canada's prosperity and the protection of our identity both require continued efforts in conservation.

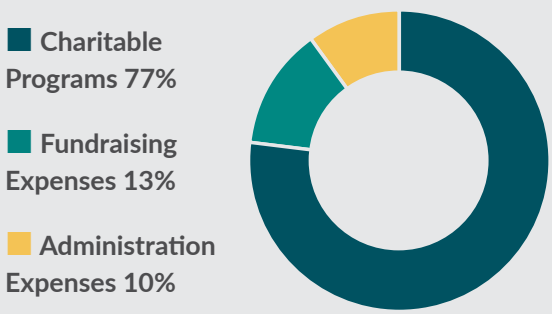


Your Donations at Work

CWF efficiency ratios were all well within guidelines of the Canada Revenue Agency.

Investments in charitable programs were $24.7 million. This investment was used to strengthen programming for endangered species and/or those in serious decline, including whales, turtles, salmon, Monarch Butterflies and many others. This work is carried out in freshwater, marine and terrestrial environments. CWF takes a balanced approach to resolving conservation challenges, including research to better understand how to be most effective in our programs, direct conservation programming, education to maintain public support for and active participation in conservation, and advocacy to shape national policy to benefit wildlife.

Our education programs also help develop future conservation leaders by creating opportunities for youth to experience time outdoors, to learn about nature, and to do volunteer service to improve conditions for wildlife.



CANADIAN WILDLIFE FEDERATION

45° 53' 03.5" N
77° 38' 25.6" W

Barron Canyon
Algonquin Provincial Park, Ont.
Photo by Tam Edgerton

Your Legacy can Change the Future

By creating your legacy to support the future work of the Canadian Wildlife Federation, you can help CWF continue its critical conservation work and education programs without affecting your current finances or financial plans. There are many ways to create a Legacy Gift in your estate planning, allowing you to choose the one that is best for you.

Make this decisive act to conserve Canadian wildlife and its habitat far into the future.

Canadians deeply value our inspiring wildlife and its natural habitat.

It is our legacy. It defines who we are; it defines who you are.

For more information, contact:

Nancy Smith, Planned Giving Specialist

Nancys@cwf-fcf.org | 1.877.599.5777 ext. 221

CanadianWildlifeFederation.ca/Legacy-Giving

CANADIAN WILDLIFE FEDERATION

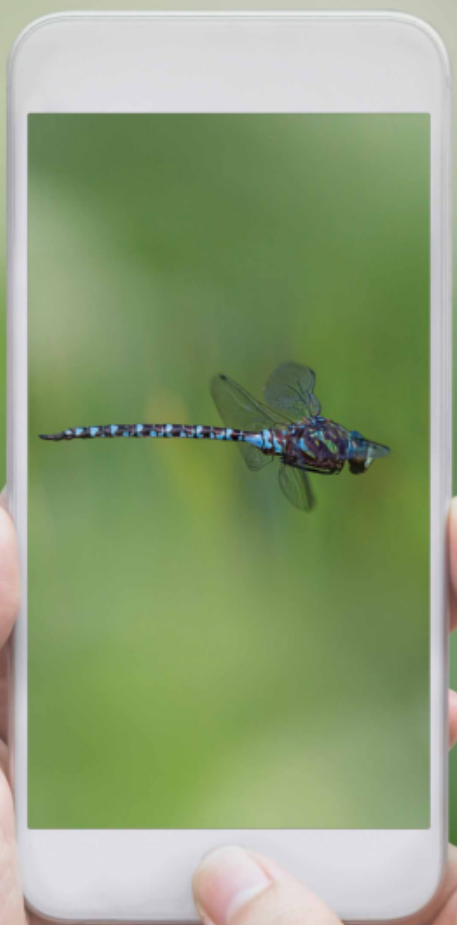
Your opinion matters...

Please take a moment to complete our will and estate survey today by following the link in the QR code.

PHOTOS: CWF PHOTO CLUB | SUZANNE SOUTHON; JESS DEEKS

What Will You Find During The Great Canadian Bioblitz?

It's an event that happens once a year – so big, it involves the entire country! The Canadian Wildlife Federation invites everyone in Canada to join the Great Canadian Bioblitz, the event that asks the simple question – how many species will you find? Participation is easy. From September 21 to 28, upload all the observations and sound recordings of flora and fauna you can find into the iNaturalist Canada platform. You'll be contributing to a national inventory of our greatest resource: nature! There are even prizes to be won just for participating. Cameras up, Canada! Bring your sense of adventure and discovery alive.



Take part in the Great Canadian Bioblitz.
Learn more at **GreatCanadianBioblitz.ca!**

CANADIAN WILDLIFE FEDERATION

Go RVing CANADA

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